overvoltage protection

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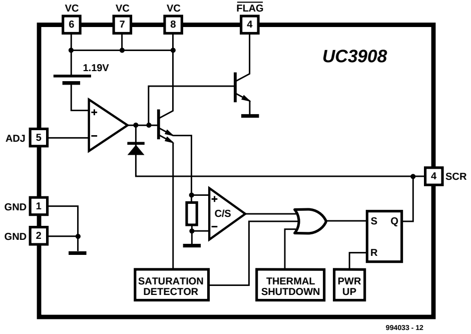
Electronic circuits must never be operated with an excessive supply voltage. Such a situation may be prevented with the protection circuit shown in the diagram. If the current through the IC becomes excessive, or the IC overheats, an external silicon-controlled rectifier (thyristor), Th$_1$, is triggered, whereupon the supply voltage is short-circuited. This causes the current limiting in the power supply to be enabled or the relevant fuse in the supply to blow. Whatever, the circuit being supplied is protected.

In the diagram, the overvoltage protection comes into action when the supply voltage exceeds 5 V, but this may be set anywhere



between 3.3 V and 9 V. Potential divider R_1-R_2 reduces the supply voltage to 1.19 V (nominal) at the ADJ(ust) pin of IC_1. As long as the level at this pin is ≤ 1.14 V, IC_1 remains in the standby mode and draws a current of about 70 µA.

When the potential at pin 5 rises above 1.19 V (maximum 1.24 V), IC_1 draws a current of up to 17 A so as to pull down the supply voltage – the $\overline{\text{flag}}$ signal is then actuated. If in this situation the peak current of 17 A is exceeded, or the body temperature of the IC rises above 165 °C, or when the internal shunt transistor goes into saturation, the external thyristor is triggered via pin 4 (SCR). This protects the IC itself and ensures that the overvoltage is negated. The rating of the thyristor must, of course, be in accordance with that of the power supply. In this situation, IC_1 shorts out its internal shunt transistor to minimize the internal dissipation.

The UCC3908 is available in three different enclosures. For situations in which large supply currents flow for long periods, the TO-220 version is recommended (if necessary with heat sink). When the load current is not large, the SO-8 version may be used. In that situation, it may even be possible to omit the thyristor, but the anticipated maximum temperature must then be calculated very carefully.

Further information from: http://www.unitrode.com

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